

FIG. 1

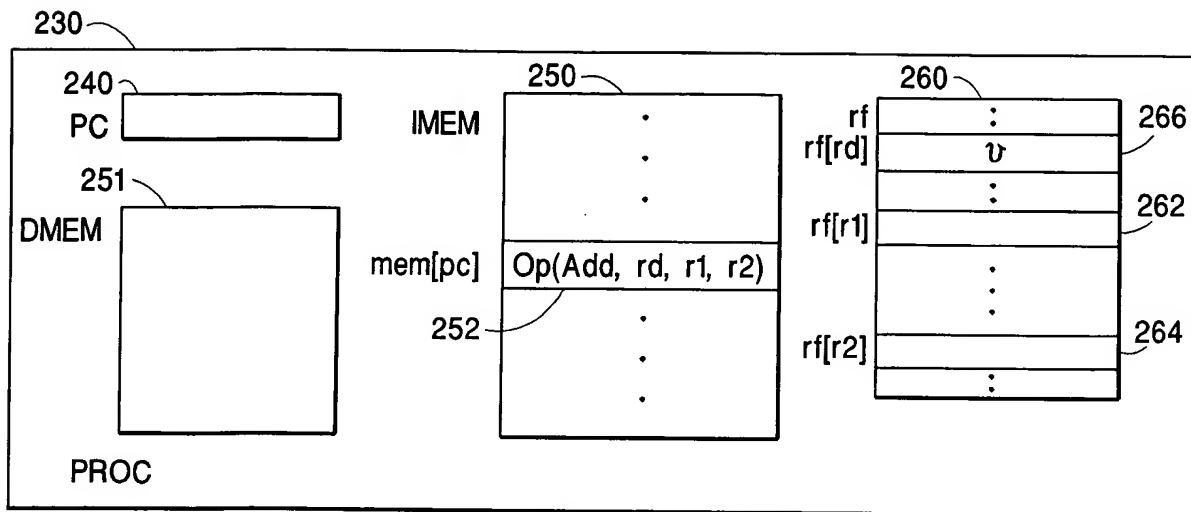


FIG. 2A

	LHS TERM	PREDICATE →	RHS TERM	
	222	224	226	220
ADD RULE:	Proc (pc, rf, im, dm)	imem[pc] Op(Add, rd, r1, r2)	proc (pc+1, rf[rd:=v], im, dm) v=rf[r1]+rf[r2]	
		210		

TRS RULES

FIG. 2B

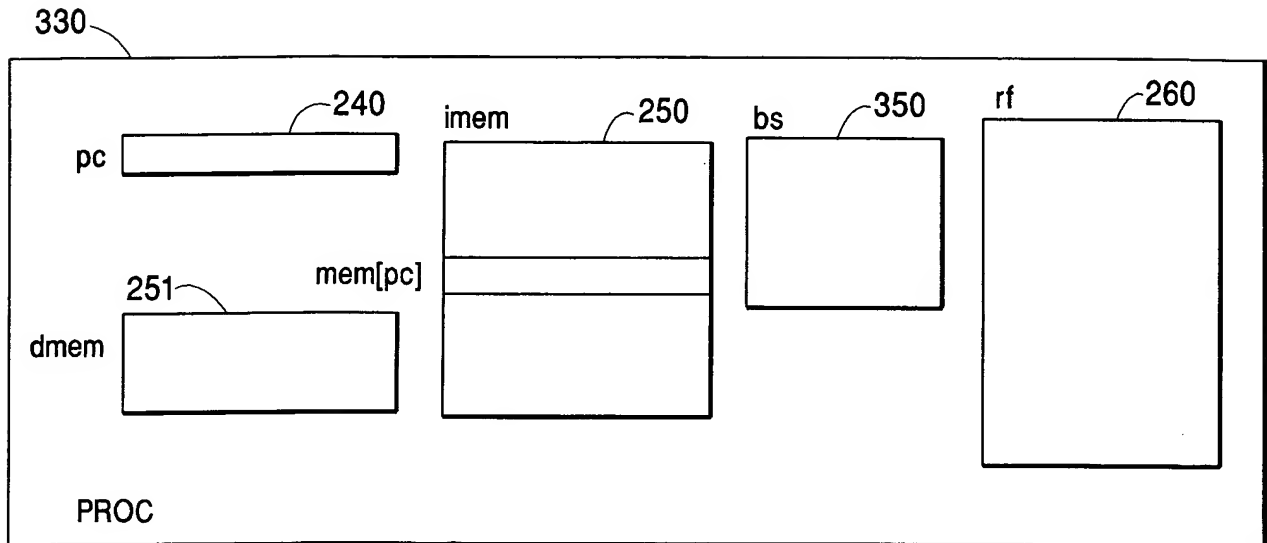


FIG. 3A

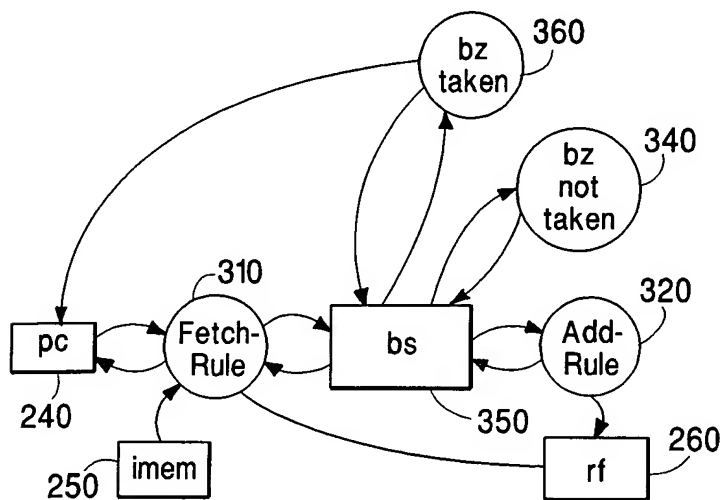


FIG. 3B

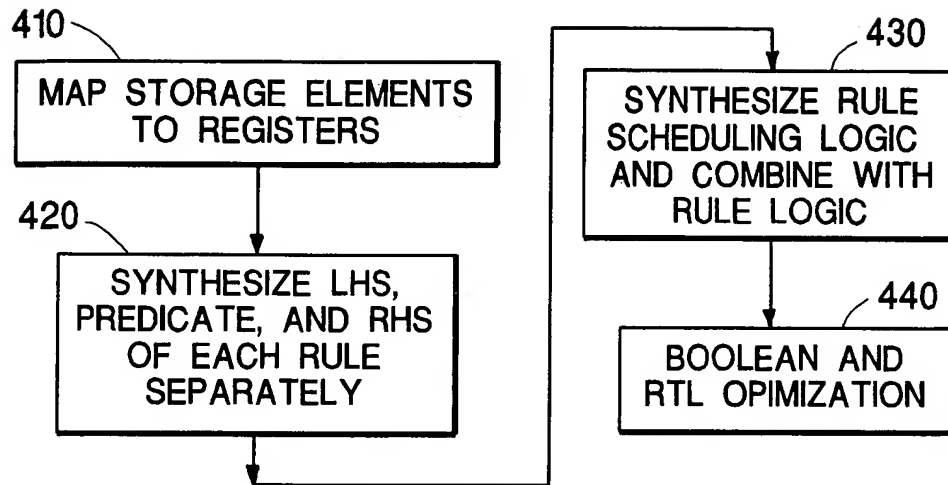


FIG. 4

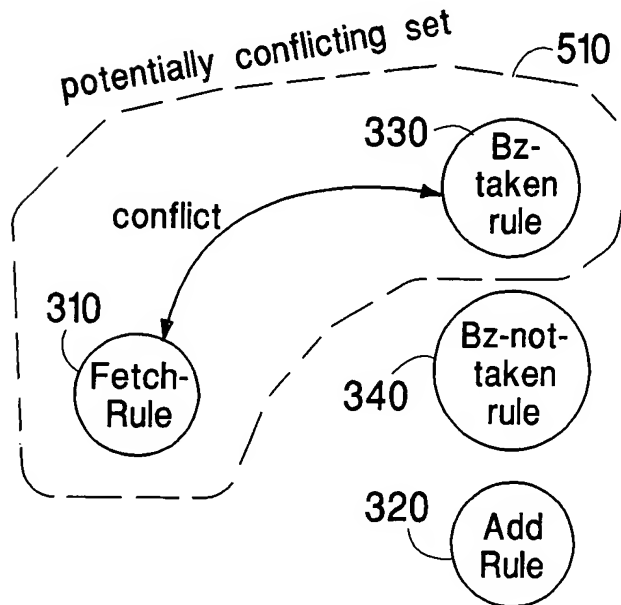
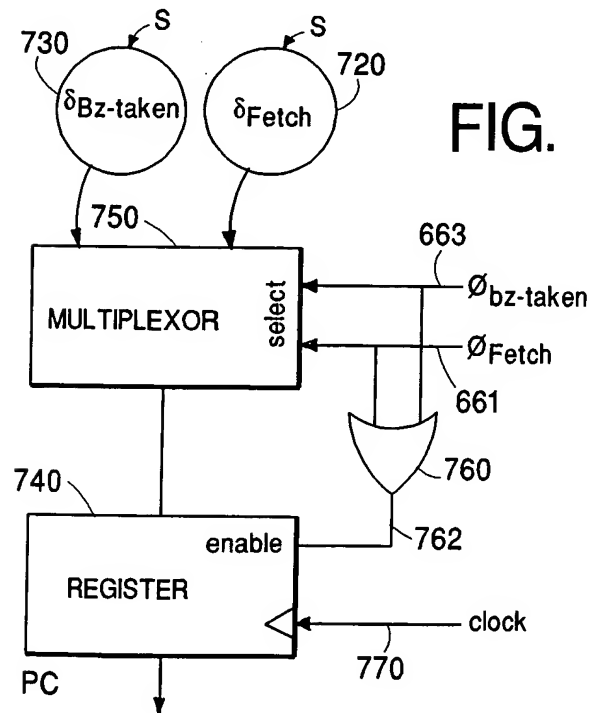
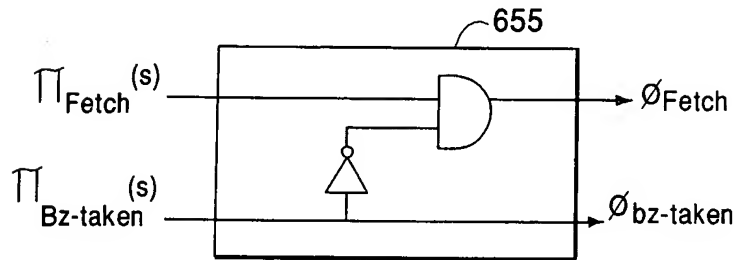
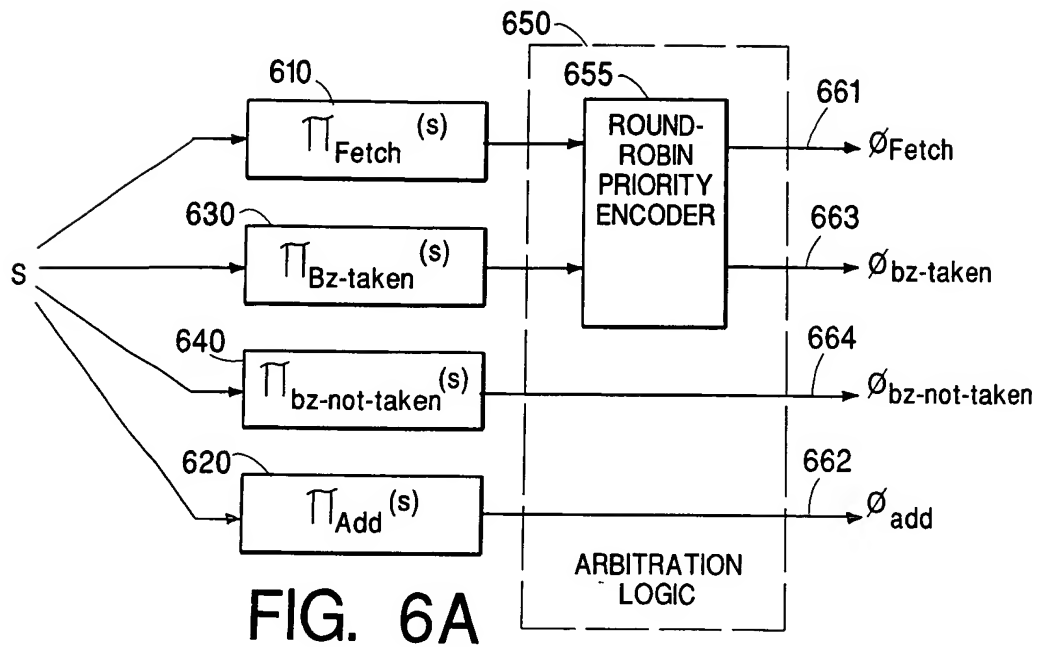


FIG. 5



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701 Type    PROC = Proc(PC,RF,IMEM,DMEM)
702 Type    PC = Bit[n]
703 Type    ADDR = Bit[n]
704 Type    VALUE = Bit[n]
705 Type    RF = Array VALUE[RNAME]
706 Type    RNAME = Reg0 || Reg1 || Reg2 || Reg3 || . . . . Regm
707 Type    IMEM = Array INST[PC]
708 Type    DMEM = Array VALUE[ADDR]
709 Type    INST = Loadc(RNAME,VALUE)
710           || Loadpc(RNAME)
711           || Op(MINOR,RNAME,RNAME,RNAME)
712           || Bz(RNAME,RNAME)
713           || Load(RNAME,RNAME)
714           || Store(RNAME,RNAME)
715 Type    MINOR = Add || Sub || . . . .

```

FIG. 7

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801 Proc(pc,rf,im,dm)
802 if im[pc]≡Loadc(rd,const)      → Proc(pc+1,rf[rd:=const],im,dm)
803 if im[pc]≡Loadpc(rd)            → Proc(pc+1,rf[rd:=pc],im,dm)
804 if im[pc]≡Op(op,rd,r1,r2)      → Proc(pc+1,rf[rd:=op(rf[r1],rf[r2])],im,dm)
805 if im[pc]≡Bz(rc,rt) & rf[rc]≡0 → Proc(rf[rt],rf,im,dm)
806 if im[pc]≡Bz(rc,rt) & rf[rc]≠0 → Proc(pc+1,rf,im,dm)
807 if im[pc]≡Load(rd,ra)          → Proc(pc+1,rf[rd:=dm[rf[ra]]],im,dm)
808 if im[pc]≡Store(ra,r)          → Proc(pc+1,rf,im,dm[rf[ra]:=rf[r]])

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FIG. 8

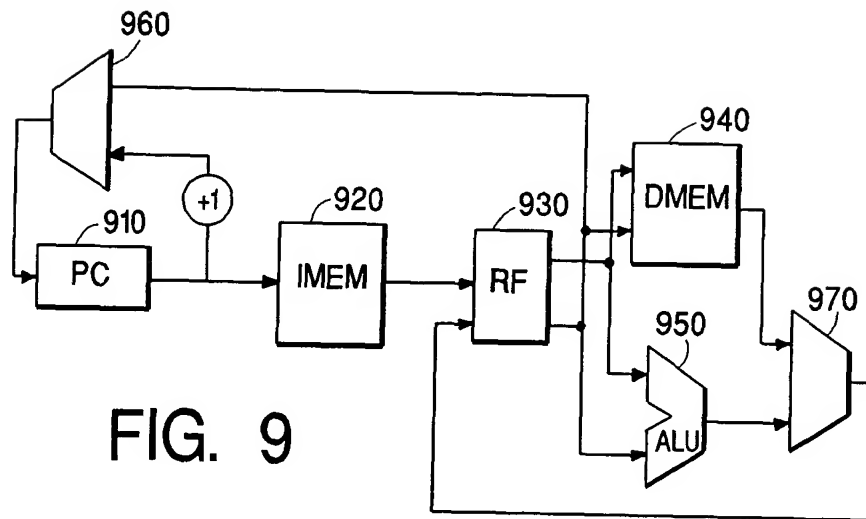


FIG. 9

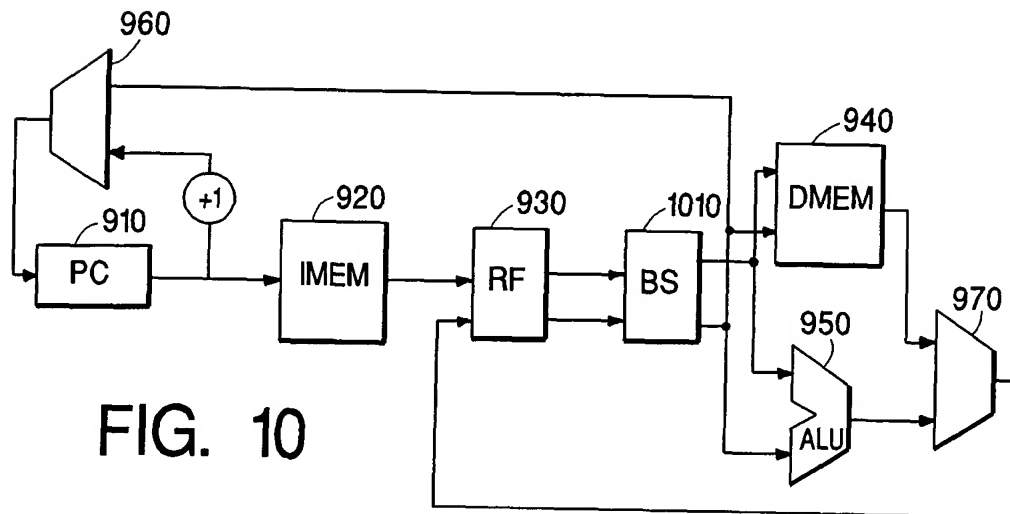


FIG. 10

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1101 Type    PROCp = Procp(PC,RF,BS,IMEM,DMEM)
1102 Type    BS = FIFO ITEM
1103 Type    ITEM = Op(MINOR,RNAME,VALUE,VALUE)
1104          || Bz(VALUE,VALUE)
1105          || Load(RNAME,ADDR)
1106          || Store(ADDR.VALUE)  FIG. 11
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```
1201      Procp(pc,rf,bs,im,dm)
1202          if im[pc]≡inst and (Source(inst) ∩ Target(bs) ≡ ∅)
1203 → Procp(pc+1,rf,enq(bs,Decode(inst)),im,dm)  FIG. 12A
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```
1211 Procp(pc,rf,bs,im,dm) where itemp:=first(bs)
1212 if itemp≡Op(op,rd,v1,v2)      → Procp(pc,rf[rd:=op(v1,v2)],deq(bs),im,dm)
1213 if itemp≡Bz(vc,vt) & vc≡0    → Procp(vt,rf,clear(bs),im,dm)
1214 if itemp≡Bz(vc,vt) & vc≠0    → Procp(pc,rf,deq(bs),im,dm)
1215 if itemp≡Load(rd,va)         → Procp(pc,rf[rd:=dm[va]],deq(bs),im,dm)
1216 if itemp≡Store(va,v)         → Procp(pc,rf,deq(bs),im,dm[va:=v])
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FIG. 12B


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1301 Procp(pc,rf,bs,im,dm)
1302   if im[pc]≡inst and im[pc+1]≡inst'
1303   and Source(inst)∩Target(bs)≡∅
1304   and Source(inst')∩(Target(bs)∪Target(inst))≡∅
1305 → Procn((pc+1)+1,rf,enq(enq(bs,Decode(inst')),Decode(inst')),im,dm)

```

FIG. 13A

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1311 Procp(pc,rf,bs,im,dm) where Op(op,rd,v1,v2):=first(bs), itemp:=first(deq(bs))
1312 if itemp≡Op(op',rd',v1',v2') → Procp(pc,(rf[rd:=op(v1,v2)])[rd':=op'(v1',v2')],deq(deq(bs)),im,dm)
1313 if itemp≡Bz(vc,vt) & vc≡0 → Procp(vt,rf[rd:=op(v1,v2)],clear(bs),im,dm)
1314 if itemp≡Bz(vc,vt) & vc≠0 → Procp(pc,rf[rd:=op(v1,v2)],deq(deq(bs)),im,dm)
1315 if itemp≡Load(rd',va) → Procp(pc,(rf[rd:=op(v1,v2)])[rd':=dm[va]],deq(deq(bs)),im,dm)
1316 if itemp≡Store(va,v) → Procp(pc,rf[rd:=op(v1,v2)],deq(deq(bs)),im,dm[va:=v])

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FIG. 13B

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1321 Procp(pc,rf,bs,im,dm) where Bz(vc,vt) := first(bs), itemp := first(deq(bs))
1322 if itemp ≡ Op(op,rd,v1,v2) & vc ≠ 0 → Procp(pc,rf[rd := op(v1,v2)],deq(deq(bs)),im,dm)
1323 if itemp ≡ Bz(vc',vt') & vc ≠ 0 & vc' ≡ 0 → Procp(vt',rf,clear(bs),im,dm)
1324 if itemp ≡ Bz(vc',vt') & vc ≠ 0 & vc' ≠ 0 → Procp(pc,rf,deq(deq(bs)),im,dm)
1325 if itemp ≡ Load(rd,va) & vc ≠ 0 → Procp(pc,rf[rd := dm[va]],deq(deq(bs)),im,dm)
1326 if itemp ≡ Store(va,v) & vc ≠ 0 → Procp(pc,rf,deq(deq(bs)),im,dm[va := v])

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FIG. 13C

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1331 Procp(pc,rf,bs,im,dm) where Load(rd,va) := first(bs), itemp := first(deq(bs))
1332 if itemp ≡ Op(op,rd',v1,v2) → Procp(pc,(rf[rd := dm[va]])[rd' := op(v1,v2)],deq(deq(bs)),im,dm)
1333 if itemp ≡ Bz(vc,vt) & vc ≡ 0 → Procp(vt,(rf[rd := dm[va]]),clear(bs),im,dm)
1334 if itemp ≡ Bz(vc,vt) & vc ≠ 0 → Procp(pc,(rf[rd := dm[va]]),deq(deq(bs)),im,dm)

```

FIG. 13D

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1341 Procp(pc,rf,bs,im,dm) where Store(va,v) := first(bs), itemp := first(deq(bs))
1342 if itemp ≡ Op(op,rd,v1,v2) → Procp(pc,rf[rd := op(v1,v2)],deq(deq(bs)),im,dm[va := v])
1343 if itemp ≡ Bz(vc,vt) & vc ≡ 0 → Procp(vt,rf,clear(bs),im,dm[va := v])
1344 if itemp ≡ Bz(vc,vt) & vc ≠ 0 → Procp(pc,rf,deq(deq(bs)),im,dm[va := v])

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FIG. 13E